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ABSTRACT

This study was conducted to fulfill two objectives: to gather the data necessary to define the core collection, i.e., a subset of the holdings that can be identified with reasonable assurance as being able to fulfill a certain predetermined percentage of the future demand on the present collection, and to examine the value of these data as a management tool in a small university library. The core collection was identified by collecting samples from circulation records and shelved materials and recording on cards the latest due date and circulation date for each item, along with its accession number. The cards were then manually sorted into groups by 6-month periods for analysis. A juxtaposition of the circulation and collection data was used to determine the percentage of circulation that was being met by given percentages of the collection. This collection analysis technique is expected to be useful in the conversion of manual records for automated circulation, the evaluation of collection development policies, and the establishment of continuity in a weeding program. The report includes discussions of these applications, the background of the library, assumptions and definitions used in the study, 20 references, and 24 tables of data. (RBF)

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Examination of Potential Management Decisions Based Upon A Core Collection Derived From Last Circulation Date Data

Research Report No. 1

November, 1981

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Preface

This research report is the first in a series of papers the author intends to publish at irregular intervals. The papers are intended to utilize scientific management techniques to evaluate and describe various library operations and services, in order that managerial decisions may be made on a rational rather than an intuitional basis.

Objective of the Study

This study was undertaken to fulfill two objectives: (1) gather the data necessary to define the core collection based upon last circulation date; and, (2) examine the value of this data as a management tool in a small university library.

Definition of Terms

Core Collection - A sub-set of the holdings that can be identified with reasonable assurance as being able to fulfill a certain predetermined percentage of the future demand on the present collection.

Cut-point - The exact time point that determines whether a book is in the core or the non-core collection; i.e., the criterion used for weeding.

Discardment - defined as actual physical elimination of bibliographical units and catalog entries from the library.

Non-Core Collection - Subset of the holdings identified as representing a very small amount of the likely future use of a collection.

Shelf-time period - The length of time a book remains on the shelf between circulation.

Weeding - is the quality control of a collection's usefulness. In practice, it consists of the physical removal of those materials (from the core circulating collection) which have little or no evidence of use over a period of time.

Background

The university is a small special mission university within a larger state university system. The university focuses on undergraduate education with programs relating to professional careers in industry, home economics, applied arts, teacher education and the helping professions. The university also offers selected master's and educational specialist programs in its special mission areas.

Historically, the emphasis has been on selecting faculty with the primary emphasis on teaching skills with research as a peripheral consideration. This is now changing and the university appears to be in a transition stage with greater emphasis being placed upon faculty research.

Collection growth patterns are similar to those of other public institutions of higher learning. In 1950 holdings were 30,000 volumes, as shown in table 24 this grew to 175,000 volumes by 1980. During this same period the library carried out several major weeding projects as well as weeding moderately on a continuing basis.

During the 1950's approximately 4,000 volumes were weeded. This grew to approximately 37,000 volumes during the decade of the 1970's. In the latter period the library reclassified from Dewey to the Library of Congress classification scheme. It is important to note the heavy weeding pattern as it should have an effect upon the data gathered for this paper.

Circulation policies have remained relatively stable during the past decade for the main circulating collection. Faculty and students are allowed to charge materials for four weeks with the option to renew for two additional weeks provided another patron has not placed a hold on the item. As is typical with academic institutions, circulation has a well defined cyclical pattern with circulation being light in the summer and at the start of each academic semester. All charged items are due at the end of each academic semester.

The library uses a Gaylord Circulation System which records the patron name, status and the date the material is due to be returned. The latter is important if one is going to conduct a use study based upon due dates.

Assumptions

A large body of knowledge has developed since the early 1960's regarding the evaluation of library collections based upon their use. An excellent review of this literature will be found in a recent paper by Olson[1]. These studies are remarkably consistant in their findings. The basic conclusions are noted below and constitute the assumptions used in developing this study.

1. The best method of predicting future use of library materials is to identify those materials used in the immediate past. This fact has been confirmed in a series of studies conducted beginning in 1961.[2-10]

2. Materials used within the library building but not charged out exhibit use patterns very similar to those materials circulated outside the library.[7,11,12]

3. Use patterns do not change radically over time. Circulation patterns exhibited today reflect circulation patterns of the past and will reflect those of the future. Trueswell performed a follow-up study eight years later in the same library, he found highly similar circulation patterns.[4]

4. A small sample taken over a short period of time will be representative of longer term circulation behavior.[7,10]

5. Materials borrowed on interlibrary loan are also those materials likely to be circulated locally.[7]

Methodology

The technique used in this research project to identify and analyze collection use is based on earlier works by Trueswell and Slote.[2-6,10] The technique is simple requiring only that a sample of circulation and a sample of materials on the shelves be collected.

The sample of materials currently circulating from the main collection was developed by examining the circulation cards for those items circulating in a given time period. The previous due date for each item was recorded on a 3 X 5 card. In the case of items circulating for the first time the complete call number was recorded. These items were subsequently checked against the shelf list to establish the accession date which was recorded in lieu of the previous circulation date. In the case of a small percentage of circulating items, the accession date was not meaningful because the item was acquired prior to November, 1966. This was the date the library began converting from the Dewey Decimal to the Library of Congress (LC) classification scheme. In the conversion process previous circulation data was destroyed and not transfered to the new book cards. As a result, neither the book card nor the accession date appeared to reflect use. In lieu of the accession date the mean date for conversion from Dewey to LC for each LC classification schedule was used. The 3 X 5 cards were then manually sorted into groups by six month periods or cells. The results are shown in Table 1.

A second sample was taken from the items on the shelves of the main collection. This sample was developed by examining every nTh book on every nTh shelf of each stack rank. The latest circulation date was recorded on a 3X5 card. In those instances where the item had not circulated the complete call number was recorded. As in the previous sample those items with no history of previous circulation were checked against the shelf list to establish the accession date. This was recorded in lieu of the last circulation date. A somewhat larger number (12.67%) of items that had no record of previous circulation and had been acquired prior to November 1966, was found in this sample. In these cases the mean date for conversion for each LC class was recorded. The use of the mean date for conversion appears to lend a conservative flavor to the overall results by inflating the core collection. The 3X5 cards were then manually sorted into groups by six month periods or cells, this data is shown in Table 2.

Data Analysis

Table 1 summarizes the data derived from the analysis of the circulation sample for the main collection. The results are very similar to those found in previous studies of academic libraries. To wit that a relatively large percentage of the items currently circulating have a history of recent circulation. As Table 1 indicates, almost 60% of the items in circulation had previously circulated in the past six months, almost 75% within the last 12 months and over 91% within the last 36 months.

While this data clearly shows that the heaviest use of the main collection was occuring among those titles which had circulated recently, it is only by looking at Table 2 that one can see how this use was distributed throughout the collection. These figures are quite different from those derived from the circulation sample. In the case of the collection sample a relatively small percentage of the collection (less than 27%) had circulated within the last 12 months. Slightly more than 40% of the collection had circulated within the past 24 months.

The data becomes most meaningful when the circulation and collection samples are juxtaposed as in Table 3. This table clearly shows what percentage of circulation is being met by what percent of the collection. At 6 months 60% of the circulation is being met by only 17.34% of the collection. At 36 months over 91% of the circulation is being met by approximately 50% of the collection.

A practical application of the data is shown in Table 4. Assuming a collection size of 141,000 volumes one can easily determine how many volumes could be weeded once the core collection had been defined. As an example if the library defined the core collection as those materials meeting 99% of future circulation then the cut date would be 120 months. Applying this data to the collection would result in the removal of 10.70% of the collection or 15,087 items.

The data examined up to this point is for the entire collection. The question arises; what is the relationship between data gathered for the entire collection and similar data gathered for subsets of the collection? In order to find the answer to this question samples were taken from several subsets of the collection. Samples were drawn from the LC classes P-PY's, the H's and the T's. Data for these subset samples are recorded in Tables 5-16. The methodology for conducting the subset sampling was identical to that used in sampling the entire collection.

The data gathered for the subset samples is most meaningful when viewed in relationship to other subset samples and the collection as a whole. This is shown in Table 17. Data for the Educational Materials Center (EMC) was included in this Table even though the raw data was not. This data is available in an earlier study of the EMC by Olson.[1] This table clearly indicates rather wide variation in data between the entire collection and the various subsets. If the library were to define the core collection as all material meeting 99% of future circulation, the cut date would vary considerably ranging from a high of 144 months for the P-Py subset to less than 60 months for the T's.

This would indicate that while a sample of the total collection is useful for certain planning activities it is less useful in performing a weed of the collection. The more narrowly the collection can be defined the more discriminating the weed will be.

Table 18 examines the comparative data from a sightly different perspective. In this table the percent of the collection to be weeded is compared with the percent of future use to be satisfied. For example, if the library wished to meet 100% of its future use no weeding would take place if the entire collection were being considered, on the other hand 10.6% of the H's and 5.5% of the T's can be weeded and theoretically meet 100% of future demand.

Another question which frequently arises during discussions about weeding goes something like this "Why don't we discard everything over X years old?" Table 19-22 examine this question in more detail. Again the methodology was identical to that used previously except that data was sorted by year rather than previous circulation date.

Table 23 offers a comparison between weeding based upon previous circulation date and copyright date. The table clearly shows that previous use is a much better discriminator than copyright date. If the library wished to meet 99% of its future demand it could weed 10.4% of the collection based upon previous circulation date and only 4.46% of the collection based upon copyright data.

Potential Uses of Last Circulation Date Data by Management

Introduction

The application of the techniques described in this paper, when used properly, can be a powerful management tool. All too frequently these techniques are thought of in terms of weeding and discardment. In fact they can provide data useful in a wide range of management decisions. What follows is an examination of how the techniques could be or perhaps should have been used in a small university library. In some cases it is too late for the library being examined but others may be able to benefit from the experiences described.

Selection of Material for Remote of Compact Storage

The need to remove material from a circulating collection and send them to a storage facility is an option that librarians will be increasingly faced with in the coming decade. As Schorrig[13] pointed out, even in the glory years of library construction libraries were unable to keep up with space requirements. This problem will most certainly be exacerbated by tight budgets during the 1980's. Options to new libraries may include conversion of existing stack space into compact storage or building remoted storage facilities. In either case the librarian will be faced with removing a certain number of materials from the circulating collection (weeding). How one determines which materials should be removed is relatively simple, the techniques discribed in this paper will help answer a number of key questions and provide a basis for long range planning.

Questions can be raised from a variety of sources. As an example a recent ALMS (Alternative Means of Storage) planning paper indicated that the library should plan on weeding 25 percent of its collection.[14] Some may have viewed this possibility with considerable alarm and as an unreasonable request. However, a quick examination of the data in Table 4 indicated that the library could weed 25% of its collection and still satisfy 97% of future use. If more detailed information on the collection had been available the percent of future use satisfied might well have been higher. By weeding 25% of the collection 3% of future use will not be satisfied. Even a relatively low figure such as 3% may be viewed by some as unacceptable. In fact, when this figure is viewed in perspective it tends to become relatively insignificant. Consider for example,

the studies which show that libraries are able to supply only 50 to 60% of the materials patrons want even when the majority of those materials are owned by the library.[15] Panic can certainly be avoided if scientific management techniques are understood and used.

In addition to answering questions regarding the impact on future circulation if the library removes a number of volumes from the collection the available data will also answer related questions. It indicates how many volumes the library will be able to weed if it wants a core collection meeting n% of future circulation. It will also indicate the cut-point if the library wishes to establish the core collection at n% of future circulation.

Discardment

The techniques described in this paper are generally thought to be applicable to the problem of weeding for the purpose of discardment. The techniques and uses described in the previous section also apply to this section. The only difference is in the final destination of the material being weeded. Discardment is a policy decision which must be made by library management. The techniques described in this paper provide management with the data necessary for making an informed decision.

Reclassification

Changing from one classification scheme to another was one of those tasks that many academic libraries undertook in the late 1960's and early 1970's. Many completed the task while others are continuing to labor. Generally libraries converted from the Dewey Decimal or a local scheme to the Library of Congress classification system. Many libraries also began to weed their collections as a part of the reclassification process. One of the uses of the technique under discussion is to provide a systematic scientifically valid approach to the weeding process.

The library under discussion was one of those libraries that began reclassification in 1966. Approximately 62,000 volumes were in the Dewey collection when reclassification began. The project took eleven years and eventually reclassified 43,740 volumes or 70.54% of the initial collection. Assuming that well defined weeding guidelines based upon use had been applied, which they were not, those items retained in the core collection would have met 97% of future circulation demand. Unfortunately the project was carried out over a lengthy period of time, with a variety of staff and ill defined weeding policies. Although 20-20 hindsight is always better than foresight the consequences of such a reclassification were easy to imagine and could clearly be seen.

As a by-product of the existing study data was gathered, rather unintentionally, on the number of reclassified items in the collection that have not circulated since reclassification. This data resulted from the failure to transfer the date of last circultion to new book cards. The analysis shows that approximately 17,750 of the 43,740 items reclassified have never circulated. This represents 40% of the total. It does not include many reclassified titles since removed from the collection. For example, a sampling of recent duplicate titles removed from the collection indicated that in excess of 53% of the titles and a higher percentage of the volumes were items recently reclassified. It should be noted that an estimated 10-15% of these would have fallen into the core collection at the 90% level of future satisfaction.

Using the techniques described in this paper would have no doubt considerably reduced the amount of effort required in reclassification. It would have been possible by reclassifying only 10,750 items to reclassify those materials which would have met approximately 60% of future circulation. Ten years later it is doubtful if many more items would have required reclassification. Libraries who have not completed reclassification projects can only learn from this experience.

Retrospective Conversion

As noted in the previous section, reclassification was the rage of the late 60's and into the decade of the 70's. The rage of the 1980's appears to be the conversion of cataloging data from printed cards to machine readable files. Many libraries have already embarked upon major retrospective conversion projects. As used in this section, retrospective conversion involves the creation of a MARC II like record using one of the bibliographic utilities, a commercial vendor or through a local system. One would hope that the same poorly conceived strategies evident in many retrospective conversion projects will not be repeated. As Matthews has pointed out one should never undertake a retrospective conversion project without first conducting an extensive weed of the collection.[16] Conducting a simple study similar to that described in this paper will quickly provide the information necessary for management to make informed choices.

Conversion for Automated Circulation

Conversion of manual records for an automated circulation system is similar to retrospective conversion. The differences are in the comprehensiveness of the record and their intended use. Retrospective conversion implies a MARC.II record which may be used for a multiplicity of purposes one of which could be an automated circulation file. If retrospective conversion has not taken place previously most often materials are converted on the fly, that is as they return from circulation. If this process is used then the techniques described in this paper are also being used albeit perhaps unwittingly.

The value of using a scientific approach in which data is gathered in a systematic fashion rather than during the actual process as in "on the fly conversion" lies in the area of planning. Questions like "How many items requiring conversion during the first year will be returned through circulation?" The answer derived from Table 3 is 38,098. "How many items would I expect in the second year?" Again Table 3 provides the answer which is 18,555. One of the frequent laments of librarians having recently "converting on the fly" is if I had it to do over again I would convert more items before I started circulating material on the system. The data available in Table 3 will provide the library with information regarding the number of items that must be converted before n% of future circulation can be met. If the figure selected is 90% then approximately 45% of the collection must be converted. With this information it will be possible to properly plan the scope of the conversion project. It must be emphasized, however, that proper planning can only be achieved if the information is made available to top management.

Automated Circulation-Matching Bibliographic and Item Records

In implementing an automated circulation system some libraries may not wish to convert "on the fly" or they may have created a bibliographic record using one of the bibliographic utilities and now face the problem of matching the bibliographic record with the item record. The library has several options in matching bibliographic and item data. One approach is to move through the shelflist or stacks in sequential order matching every item. A variation on this approach is to move through the most highly used portions of the collection first. The difficulty with both approaches is that library management cannot determine the percent of circulation that can be processed on the automated system prior to its implementation.

Another methodology based upon the scientific weeding techniques described in this paper provides the missing data. Referring to Table 3 in the appendix one can see how this would work. If, for example, the library wants to convert only those materials that will meet 90% of future circulation staff would simply move through the stacks removing, for subsequent matching, all materials with a last circulation date of less than thirty months. This would constitute approximately 45% of the collection. The remaining 55% of the collection could be matched as the items are circulated, or perhaps considered for weeding.

Evaluation of Collection Development Policies

The techniques described in this paper can be used in conjunction with other scientific measurement techniques to evaluate collection development policies and their implementation.[15,17] As an example, Table 3 indicates that almost 60% of circulation is being met by only 17% of the collection. With this benchmark in mind it is possible to develop a measurable objective for collection development, such an objective might read "Within the next X months the percentage of the collection falling within the core at the 6 month cut date will be raised to Y percent." This assumes that as the percent of circulation and percent of the collection move toward equality the more vital or relevant the collection is to the user. For example if 5% of the collection was meeting 95% of the circulation the collection would be considered poor in terms of user relevance. On the other hand a collection in which 50% of the items were meeting 50% of the circulation would have a high degree of relevance.[18]

Establishing Continuity within the Weeding Program

One of the results frequently encountered when using subjective weeding techniques is a weeding program that is haphazard and disjointed. This appears to be an accepted fact when subjective techniques are employed on a consistant basis. "one man's meat is another's poison" is certainly an apt description of the conflicts likely to be encountered when weeding in an academic environment. Faculty members come and go as do collection development librarians. Interests and abilities also differ widely within both groups. Even with consistancy in staff the likelihood of finding enough knowledgeable faculty interested in participating in the weeding process is relatively small. Weeding guidelines such as those culled from collection development policies and noted below provide little in the way of guidance to those carrying out the weeding program.

"Any book or media item over 50 years old that shows little evidence of use, especially those in areas of remote institutional interests. (Note: fifty years is not sacred, and can be adjusted to any date where relevancy is lost.)"

"Out-of-date materials which no longer conform to prevailing ideas of presentation, i.e., courses of study, travel books, films, audio tapes, etc."

"Obsolescent anthologies, ephemeral fiction, and outmoded translations not of determined research interest."

If vague guidelines accomplish anything they will probably confuse the issue. Indeed that may well be their intended purpose. If the policies are sufficiently confusing weeding policy and practice becomes whatever is convenient for the person doing the weeding thus preventing any effective evaluation of the weeding program. One could easily hypothesize that if five different people applied guidelines of the quality of those noted above five very distinct core and non-core collections would result.

Lancaster notes another obvious limitation of subjective weeding techniques.

> "One obvious limitation of the methods already discussed is that they are more concerned with the collection itself than with its use. The ultimate test of the quality of a library collection, however, is the extent and mode of its use..."[20]

Collection weeding policies should be written in such a way that the weeding process transcends the individuals carrying it out. Regardless of the level of personnel conducting the weed, the likelihood that certain specified items will remain in the core collection while others will be assigned to the non-core collection will be high. An example of such a weeding statement might:

"The EMC collection will be weeded so that it will continue to Satisfy 98% of future circulation."

In some instances the library may wish to retain clearly identifiable items in the collection using a criteria not based upon use. In such cases the previous weeding statement might be amended to include the following adendem:

"Exceptions to this policy will be those items having received Caldecott or Newbery awards".*

Using objective weeding criteria and techniques such as those described above will insure that weeding policy is consistant over time and that it will not be dependent upon a few key people to carry it out. If five people carried out a weed of the EMC using the policies described above those items assigned to the core and non-core collections should be identical.

In addition scientific weeding techniques will help insure that a balanced weed is conducted throughout the entire collection. The decision of what to weed is determined by management and is not influenced by the availability or quality of the scholars or professionals involved.

*It is suggested that criteria for retention other than use be employed sparingly. Olson has found that materials retained based upon criteria other than use will be unlikely to circulate.[1]

Improving Collection Development Productivity

Although increased productivity is not often thought of in relation to service organizations it may well be an important consideration when allocating staff in the 1980's. As aluded to in the previous section, the role of the professional librarian in the weeding program ought to be one of planner, supervisor and faculty liason. The techniques described in this paper provide a procedure which avoids the unnecssary and time consuming process typical of subjective based weeding programs. The technique is so simple that it can be carried out by clerical staff and student assistants with the results being the same as if it had been carried out by a trained professional. Two recent studies have identified increased productivity and the ability to use non-professional staff as side benefits of using the techniques described.[1,19] Although it may be a highly emotional issue for management to face the fact is clear, weeding is largely a clerical activity which with the exceptions of planning, supervision and faculty liason should not be carried out by professional librarians.

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TABLE 1

Circulation Sample

N=1944

Circulation Cells in Months	Circulation Per Cell	Cumulative Circulation	Percent of Cumulative Circulation
6	1160	1160	59.67
12	290	1450	74.58
18	183	1633	84.00
24	74	1707	87.80
30	56	1763	90.68
36	21	1784	91.76
42	30	1814	93.31
48	15	1829	94.08
54	20	1849	95.11
60	11	1860	95.67
66	12	1872	96.29
72	12	1884	96.91
84	13	1897	97.58
96	9	1906	98.04
108	15	1921	98.81
120	5	1926	99.07
132	8	1934	99.48
144	4	1938	99.69
156	2	1940	99.79
168	1	1941	99.84
169+	3	1944	100

TABLE 2

Collection Sample

N=1580

Cells in Months	Number of Items per Cell	Cumulative Number in Sample	Percent in Collection
6	274	274	17.34
12	153	427	27.02
18	103	530	33.54
24	105	635	40.18
30	86	721	45.63
36	57	778	49.24
42	72	850	53.79
48	56	906	57.34
54	61	967	61.20
60	46	1013	64.11
66	65	1078	68.22
72	35	1113	70.44
84	29	1175	74.36
96	65	1240	78.84
108	122	1362	86.20
120	49	1411	89.30
132	83	1494	94.55
144	39	1533	97.02
156	24	1557	98.54
168	14	1571	99.43
169+	9	1580	100.00

TABLE 3

Circulation vs. Collection Samples

Cells in Months	Percent of Circulation	Percent of Collection
6	59.67	17.34
12	74.58	27.02
18	84.00	33.54
24	87.80	40.18
30	90.68	45.63
36	91.76	49.24
42	93.31	53.79
48	94.08	57.34
54	95.11	61.20
60	95.67	64.11
66	96.29	68.22
72	96.91	70.44
84	97.58	74.36
96	98.04	78.84
108	98.81	86.20
120	99.07	89.30
132	99.48	94.55
144	99.69	97.02
156	99.79	98.54
168	99.84	99.43
169+	100.00	100.00

TABLE 4

Estimated Weeding

(Collection Size 141,000)

Cells in Months	Percent of Future Use to be Satisfied	Percent of Collection to be Weeded	Number of Items to be Weeded
6	59.67	82.66	116,550
12	74.58	72.98	102,901
18	84.00	66.46	93,708
24	87.80	59.82	84,346
30	90.68	54.37	76,661
36	91.76	50.76	71,571
42	93.31	46.21	65,156
48	94.08	42.66	60,150
54	95.11	38.80	54,708
60	95.67	35.89	50,604
66	96.29	31.78	44,809
72	96.91	29.56	41,679
84	97.58	25.64	36,152
96	98.04	21.16	29,835
108	98.81	13.80	19,458
120	99.07	10.70	15,087
132	99.48	5.45	7,684
144	99.69	2.98	4,201
156	99.79	1.46	2,058
168	99.84	.57	803
169+	100.00		

TABLE 5

Circulation Sample

P-PY
N=410

Circulation Cells in Months	Circulations Per Cell	Cumulative Circulation	Percent of Cumulative Circulation
6	159	159	38.78
12	34	193	47.07
18	75	268	65.36
24	1	269	65.60
30	29	298	72.68
36	8	306	74.63
42	16	322	78.53
48	10	332	80.97
54	12	344	83.90
60	8	352	85.85
66	9	361	88.04
72	1	362	88.29
84	6	368	89.75
96	9	377	91.95
108	4	381	92.92
120	4	385	93.90
132	17	402	98.04
144	4	406	99.02
156	4	410	100.00
168			
169+			

TABLE 6

Collection Sample

P-PY
N=419

Cells in Months	Number of Items per Cell	Cumulative Number in Sample	Percent in Collection
6	42	42	10.02
12	20	62	14.79
18	32	94	22.43
24	11	105	25.11
30	22	127	30.31
36	12	139	33.17
42	20	159	37.94
48	10	169	40.33
54	19	188	44.86
60	12	200	47.73
66	12	212	50.59
72	6	218	52.02
84	23	241	57.51
96	22	263	62.76
108	19	282	67.30
120	10	292	69.68
132	93	385	91.88
144	18	403	96.18
156	5	408	97.37
168	9	417	99.52
169+	2	419	100.00

TABLE 7

Collection vs. Collection Samples

P-PY

Cells in Months	Percent of Circulation	Percent of Collection
6	38.78	10.02
12	47.07	14.79
18	65.36	22.43
24	65.60	25.11
30	72.68	30.31
36	74.63	33.17
42	78.53	37.94
48	80.97	40.33
54	83.90	44.86
60	85.85	47.73
66	88.04	50.59
72	88.29	52.02
84	89.75	57.51
96	91.95	62.76
108	92.92	67.30
120	93.90	69.68
132	98.04	91.88
144	99.02	96.18
156	100.00	97.37
168		97.52
169+		100.00

TABLE 8

Estimated Weeding for P-PY

Collection Size = 16,500

Cells in Months	Percent of Future Use to be Satisfied	Percent of Collection to be Weeded	Number of Items to be Weeded
6	38.78	89.98	14,846
12	47.07	85.21	14,059
18	65.36	77.57	12,799
24	65.60	74.89	12,356
30	72.68	69.69	11,498
36	74.63	66.83	11,026
42	78.53	62.06	10,239
48	80.97	59.67	9,845
54	83.90	55.14	9,098
60	85.85	52.27	8,624
66	88.04	49.41	8,152
72	88.29	47.98	7,916
84	89.75	42.49	7,010
96	91.95	37.24	6,144
108	92.92	32.70	5,395
120	93.90	30.32	5,002
132	98.04	8.12	1,339
144	99.02	3.82	630
156	100.00	2.63	433
168		.48	79
169+			

TABLE 9

Circulation Sample

H's

N=512

Circulation Cells in Months	Circulation per Cell	Cumulative Circulation	Percent of Cumulative Circulation
6	354	354	69.14
12	61	415	81.05
18	37	454	88.67
24	22	474	92.57
30	9	483	94.33
36	2	485	94.72
42	5	490	95.70
48	2	492	96.09
54	3	495	96.67
60	2	497	97.07
66	2	499	97.46
72	2	501	97.85
84	7	508	99.21
96	2	510	99.60
108	2	512	100.00
120			
132			
144			
156			
168			
169+			

TABLE 10

Collection Sample

H's
N=431

Cells in Months	Number of Items per Cell	Cumulative Number in Sample	Percent in Collection
6	96	96	22.27
12	39	135	31.32
18	30	165	38.28
24	33	198	45.93
30	20	218	50.58
36	19	237	54.98
42	15	252	58.46
48	16	268	62.18
54	14	282	65.42
60	29	311	72.15
66	25	336	77.95
72	16	352	81.67
84	11	363	84.22
96	10	373	86.54
108	12	385	89.32
120	4	389	90.25
132	18	407	94.43
144	13	420	97.44
156	7	427	99.07
168	1	428	99.30
169+	3	431	100.00

TABLE 11

Circulation vs. Collection Samples

H's

Cells in Months	Percent of Circulation	Percent of Collection
6	69.14	22.27
12	81.05	31.32
18	88.67	38.28
24	92.57	45.93
30	94.33	50.58
36	94.72	54.98
42	95.70	58.46
48	96.09	62.18
54	96.67	65.42
60	97.07	72.15
66	97.46	77.95
72	97.85	81.67
84	99.21	84.22
96	99.60	86.54
108	100.00	89.32
120		90.25
132		94.43
144		97.44
156		99.07
168		99.30
169+		100.00

TABLE 12

Estimated Weeding

H's

(Collection Size = 24,612)

Cells in Months	Percent of Future Use to be Satisfied	Percent of Collection to be Weeded	Number of Items to be Weeded
6	69.14	77.73	19,130
12	81.05	68.68	16,903
18	88.67	61.72	15,190
24	92.57	54.07	13,307
30	94.33	49.58	12,202
36	94.72	45.02	11,080
42	95.70	41.54	10,223
48	96.09	37.82	9,308
54	96.67	34.58	8,510
60	97.07	27.85	6,854
66	97.46	22.05	5,426
72	97.85	18.33	4,511
84	99.21	15.78	3,883
96	99.60	13.46	3,312
108	100.00	10.68	2,628
120			
132			
144			
156			
168			
169+			

TABLE 13

Circulation Sample

T's
N=543

Circulation Cells in Months	Circulations Per Cell	Cumulative Circulation	Percent of Cumulative Circulation
6	386	386	71.08
12	68	454	83.60
18	44	498	91.71
24	15	513	94.47
30	12	525	96.68
36	3	528	97.23
42	1	527	97.42
48	2	531	97.79
54	6	537	98.89
60	1	538	99.07
66	0	538	99.07
72	1	539	99.26
84	1	540	99.44
96	2	542	99.81
108	1	543	100.00
120			
132			
144			
156			
168			
169+			

TABLE 14

Collection Sample

T's
N=435

Cells in Months	Number of Items per Cell	Cumulative Number in Sample	Percent in Collection
6	138	138	31.72
12	52	190	43.67
18	44	234	53.79
24	32	266	61.14
30	22	288	66.20
36	13	301	69.19
42	18	319	73.33
48	15	334	76.78
54	32	366	84.13
60	11	377	86.66
66	3	380	87.35
72	10	390	89.65
84	12	402	92.41
96	5	407	93.56
108	4	411	94.48
120	5	416	95.63
132	2	418	96.09
144	10	428	98.39
156	4	432	99.31
168	1	433	99.54
169+	2	435	100.00

TABLE 15

Circulation vs. Collection Samples

T's

Cells in Months	Percent of Circulation	Percent of Collection
6	71.08	31.72
12	83.60	43.67
18	91.71	53.79
24	94.47	61.14
30	96.68	66.20
36	97.23	69.19
42	97.42	73.33
48	97.79	76.78
54	98.89	84.13
60	99.07	86.66
66	99.07	87.35
72	99.26	89.65
84	99.44	92.41
96	99.81	93.56
108	100.00	94.48
120		95.63
132		96.09
144		98.39
156		99.31
168		99.54
169+		100.00

TABLE 16

Estimated Weeding

T's

(Collection Size = 20,377)

Cells in Months	Percent of Future Use to be Satisfied	Percent of Collection to be Weeded	Number of Items to be Weeded
6	71.08	68.28	13,913
12	83.60	56.33	11,478
18	91.71	46.21	9,416
24	94.47	38.86	7,918
30	96.68	33.80	6,887
36	97.23	30.81	6,278
42	97.42	26.67	5,434
48	97.79	23.22	4,731
54	98.89	15.87	3,233
60	99.07	13.34	2,718
66	99.07	12.65	2,577
72	99.26	10.35	2,109
84	99.44	7.59	1,546
96	99.81	6.44	1,312
108	100.00	5.52	1,124
120			
132			
144			
156			
168			
169+			

TABLE 17

Months Since Previous Circulation
For Segments of the Collection

COLLECTION SEGMENT	Months by % of Future Use Satisfied								
	70%	80%	90%	95%	96%	97%	98%	99%	100%
ENTIRE COLLECTION	-12	-18	-30	-54	-66	+72	-96	-120	+169
P-PY	-30	-48	+84				132	144	156
H's	+6	-12	+18	+36	-48	-60	+72	-84	108
T's	-6	-12	-18	+24	-30	-36	+48	-60	108
EMC	+6	+12	-24	36	42	+48	-54	+60	102

- = slightly less than

+ = slightly greater than

TABLE 18

Comparative Data on % of
Collection to be Weeded

COLLECTION SEGMENT	% to be Weeded by % of Future Use to be Satisfied						
	90%	95%	96%	97%	98%	99%	100%
ENTIRE COLLECTION	54	38.8	31.7	29.5	21.1	10.7	0
P-PY	42	NA	NA	NA	8.12	3.8	2.63
H's	54	45	37.8	27.8	18.3	15.7	10.6
T's	46	38	33	30	23	13.3	5.5

TABLE 19

Circulation Sample by Copyright Date

N=1014

Circulation Cells in Years	Circulation Per Cell	Cumulative Circulation	Percent of Cumulative Circulation
1	18	18	01.77
2	78	96	09.46
3	73	169	16.66
4	85	254	25.04
5	92	346	34.12
6	68	414	40.82
7	52	466	45.95
8	56	522	51.47
9	68	590	58.18
10	51	641	63.21
11	41	682	67.25
12	34	716	70.61
13	34	750	73.96
14	22	772	76.13
15	22	794	78.30
16	18	812	80.07
17	24	836	82.44
18	21	857	84.51
19	10	867	85.50
20	16	883	87.08
21	17	900	88.75
22	8	908	89.54
23	10	918	90.53
24	4	922	90.92
25	12	934	92.11
30	31	965	95.16
35	5	970	95.66
40	7	977	96.35
45	14	991	97.73
50	6	997	98.32
55	4	1001	98.71
60	5	1006	99.30
65	4	1010	99.60
70	3	1013	99.90
75	1	1014	100.00

TABLE 20

Stack Sample by Copyright Date

N=786

Circulation Cells in Years	Circulation per Cell	Cumulative Circulation	Percent of Cumulative Circulation
1	5	5	00.63
2	11	16	02.03
3	27	43	05.47
4	12	55	06.99
5	27	82	10.43
6	37	119	15.13
7	33	152	19.33
8	25	177	22.51
9	28	205	26.08
10	26	231	29.38
11	37	268	34.09
12	37	305	38.80
13	45	350	44.52
14	26	376	47.83
15	36	412	52.41
16	41	453	57.63
17	21	474	60.30
18	33	507	64.50
19	20	527	67.04
20	16	543	69.08
21	23	566	72.01
22	14	580	73.79
23	15	595	75.69
24	10	605	76.97
25	7	612	77.86
30	38	650	82.69
35	34	684	87.02
40	13	697	88.67
45	29	726	92.36
50	12	738	93.89
55	13	751	95.54
60	12	763	97.07
65	8	771	98.09
70	5	776	98.72
75	5	781	99.36
76+	5	786	100.00

TABLE 21

Circulation vs. Collection Samples

By Year

Cells in Years	Percent of Circulation	Percent of Collection
1	01.77	00.63
2	09.46	02.03
3	16.66	05.47
4	25.04	06.99
5	34.12	10.43
6	40.82	15.13
7	45.95	19.33
8	51.47	22.51
9	58.18	26.08
10	63.21	29.38
11	67.25	34.09
12	70.61	38.80
13	73.96	44.52
14	76.13	47.83
15	78.30	52.41
16	80.07	57.63
17	82.44	60.30
18	84.51	64.50
19	85.50	67.04
20	87.08	69.08
21	88.75	72.01
22	89.54	73.79
23	90.53	75.69
24	90.92	76.97
25	92.11	77.86
30	95.16	82.69
35	95.66	87.02
40	96.35	88.67
45	97.73	92.36
50	98.32	93.89
55	98.71	95.54
60	99.30	97.07
65	99.60	98.09
70	99.90	98.72
75	100.00	99.36
76+		100.00

TABLE 22

Estimated Weeding Based upon Copyright Date

(Collection Size - 141,000)

Cells in Years	Percent of Future Use to be Satisfied	Percent of Collection to be Weeded	Number of Items to be Weeded
1	01.77	99.37	140,111
2	09.46	97.97	138,137
3	16.66	94.53	133,287
4	25.04	93.01	131,144
5	34.12	89.57	126,293
6	40.82	84.87	119,666
7	45.95	80.67	113,744
8	51.47	77.49	109,260
9	58.18	73.92	104,227
10	63.21	70.62	99,574
11	67.25	65.91	92,933
12	70.61	61.20	86,292
13	73.96	55.48	78,226
14	76.13	52.17	73,559
15	78.30	47.59	67,101
16	80.07	42.37	59,741
17	82.44	39.70	55,977
18	84.51	35.50	50,055
19	85.50	32.96	46,473
20	87.08	30.92	43,597
21	88.75	27.99	39,465
22	89.54	26.21	36,956
23	90.53	24.31	34,277
24	90.92	23.03	32,472
25	92.11	22.14	31,217
30	95.16	17.31	24,407
35	95.66	12.98	18,301
40	96.35	11.33	15,975
45	97.73	7.64	10,772
50	98.32	6.11	8,615
55	98.71	4.46	6,288
60	99.30	2.93	4,131
65	99.60	1.91	2,693
70	99.90	1.28	1,804
75	100.00	.64	902
76+			

TABLE 23

Comparative Data on % of Collection to be Weeded Based upon Previous Circulation Date and Copyright Date

Technique	Percent to be Weeded by Percent of Future Use to be Satisfied									
	60	75	84	90	95	96	97	98	99	100
Previous Circulation Date	82.66	72.98	66.46	54	38.80	35	29	21	10.70	
Copyright Date	72.27	53.82	35	26.21	17.31	12.16	9.48	7.37	4.46	

TABLE 24

Collection Growth and Weeding Patterns

Year	Collection Growth	Total Volumes Weeded During Previous Decade
1950	30,000	2,300
1960	47,000	4,000
1970	109,000	5,000
1980	175,000	37,000